

CLAIMS:

1. A device for rolling a thin ophthalmic lens into a tubular configuration, comprising a pair of members slidable
5 one relative to the other, one of the members serving to receive and locate the lens and the movement being arranged to cause rolling of the lens into the tubular configuration.

2. A device according to claim 1, in which each member
10 has a concave recess, the recesses forming at one limit position of the relative sliding movement of the members a cavity which defines the tubular configuration of the rolled lens.

3. A device according to claim 2, in which each recess
15 is formed upstanding along one edge of a surface of the respective member, one of the said surfaces serving to receive the lens prior to its being rolled by relative sliding movement of the members.

20 4. A device according to claim 3, in which each recess is formed as a step portion between the said surface and further surface extending parallel thereto, the further surface of each member being in sliding contact with the said
25 surface of the other member for sliding movement of one member relative to the other.

5. A device according to any of claims 2 to 4, in which each recess is semi-cylindrical.

30 6. A device according to any of claims 2 to 5, in which at least one of the members is shaped to provide an abutment surface with which a lens being rolled is brought into contact during relative sliding movement of the members,

thereby to restrain the lens against rotational movement within the cavity and to promote rolling of the lens.

7. A device according to claim 6, in which the
5 abutment surface is formed by a land which extends along one edge of one of the concave recesses.

8. A device according to any of claims 2 to 7, having
stop means defining the limit position.

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9. A device according to claim 8, in which the stop means comprises a protruding pin on one member which abuts a surface of the other member in the limit position.

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10. A device according to any preceding claim, having means to constrain the members to slide rectilinearly relative to each other.

11. A device according to claim 10, in which the
20 constraining means comprise at least one elongate guide element on one member receivable in a corresponding aperture in the other member.

12. A device according to claim 11, in which the
25 constraining means comprise a cylindrical pin on one of the members receivable in a cylindrical bore in the other.

13. A device according to claim 12, in which the
30 constraining means comprise first and second parallel cylindrical pins receivable in respective cylindrical bores.

14. A device according to claim 13, in which the pins are both on one member and the bores in the other.

15. A device according to any preceding claim, having means to define the relative position of the two members in which rolling of the lens has been achieved.

5 16. A device according to claim 15, in which the means defining the said relative position comprises a click-stop mechanism in combination with resilient biasing means.

10 17. A device according to claim 16, in which the click-stop mechanism comprises a flexible strip projecting from one of the slidable members and engageable behind an abutment on the other member.

15 18. A device according to claim 16 or 17, in which the resilient biasing means comprises a springy arcuate member located on one of the slidable members and engageable against the other member to bias the slidable members apart.

20 19. A device according to claim 18, in which the arcuate member is located on the respective slidable member adjacent its mid-point and its free ends are engageable against the other member.

25 20. An instrument for inserting an intraocular lens into an eye, the instrument incorporating a device according to any preceding claim and delivering the rolled intraocular lens along an axis with which the lens is aligned in its tubular configuration.

30 21. An instrument according to claim 20, comprising a body portion, a nose portion forward of the body portion and having a lumen through which the lens is arranged to pass along its said axis, and a plunger movable through the body portion and the nose portion, one of said members

constituting the nose portion and the other being slidable relative thereto.

22. An instrument according to claim 21, in which the
5 nose portion is movable relative to the body portion to allow access to a rolled lens located in the lumen of the nose portion.

23. An instrument according to claim 22, in which the
10 nose portion is hingedly connected to the body portion and is movable between an open position in which said access is allowed and a closed position in which the plunger is movable into the nose portion.

24. An instrument according to claim 22, in which the
15 nose portion is separable from the body portion and the nose and body portions are a press-fit together.

25. An instrument according to claim 24, in which nose
20 and body portions are a press-fit together by means of at least one pin on one of the portions engaging in a corresponding bore in the other portion.

26. An instrument for inserting a rolled intraocular
25 lens into an eye, comprising a body portion having a longitudinal axis, a nose portion forward of the body portion and having a lumen through which the lens is arranged to pass, and a plunger movable through the body portion and the nose portion, the nose portion receiving a member which is
30 slidable relative to the nose portion and serves to receive and locate a lens to be inserted, the relative sliding movement of the slidable member and the nose portion being arranged to cause rolling of the lens into a tubular configuration in which the lens is aligned with longitudinal

axis and is engaged by the plunger as it moves through the lumen in the nose portion for insertion of the rolled lens into the eye.

5 27. An instrument according to claim 26, in which each of the nose portion and the slidable member has a concave recess, the recesses forming at one limit of the relative sliding movement of the nose portion and the slidable member a cavity which defines the tubular configuration of the
10 rolled lens.

28. An instrument according to claim 27, in which each recess is formed upstanding along one edge of a surface of the nose portion and the sliding member respectively, one of
15 the said surfaces serving to receive the lens prior to its being rolled by relative sliding movement of the nose portion and the sliding member.

29. An instrument according to claim 28, in which each
20 recess is formed as a step portion between the said surface and a further surface extending parallel thereto, the further surfaces of the nose portion and the sliding member being in sliding contact with the said surfaces of the sliding member and the nose portion, respectively, for sliding movement of
25 the sliding member relative to the nose portion.

30. An instrument according to any of claims 27 to 29, in which each recess is semi-cylindrical.

30 31. An instrument according to any of claims 27 to 30, in which at least one of the nose portion and the sliding member is shaped to provide an abutment surface with which a lens being rolled is brought into contact during relative sliding movement of the nose portion and the sliding member,

thereby to restrain the lens against rotational movement within the cavity and to promote rolling of the lens.

32. An instrument according to claim 31, in which the
5 abutment surface is formed by a land which extends along one edge of one of the concave recesses.

33. An instrument according to any of claims 27 to 32,
having stop means defining the said limit position.

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34. An instrument according to claim 33, in which the stop means comprises a protruding pin on one of the nose portion and the sliding member which abuts a surface of the other of the nose portion and the sliding member in the limit
15 position.

35. An instrument according to any of claims 26 to 34, having means to constrain the sliding member to slide rectilinearly relative to the nose portion.

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36. An instrument according to claim 35, in which the constraining means comprise at least one elongate guide element on one of the nose portion and the sliding member receivable in corresponding an aperture in the other of the
25 nose portion and the sliding member.

37. An instrument according to claim 36, in which the constraining means comprise a cylindrical pin on one of the nose portion and the sliding member receivable in a
30 cylindrical bore in the other of the nose portion and the sliding member.

38. An instrument according to claim 37, in which the constraining means comprise first and second parallel

cylindrical pins receivable in respective cylindrical bores.

39. An instrument according to claim 38, in which the pins are both on one of the nose portion and the sliding
5 member and the bores in the other.

40. An instrument according to any of claims 26 to 39, having means to define the relative position of the nose portion and the slidable member in which rolling of the lens
10 has been achieved.

41. An instrument according to claim 40, in which the means defining the said relative position comprises a click-stop mechanism in combination with resilient biasing means.
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42. An instrument according to claim 41, in which the click-stop mechanism comprises a flexible strip projecting from the nose portion or the slidable member and engageable behind an abutment on the sliding member or the nose portion,
20 respectively.

43. An instrument according to claim 41 or 42, in which the rolling body portion comprises a springy arcuate member located on the nose portion or the slidable member and
25 engageable against the slidable member or the nose portion, respectively, to bias the nose portion and the slidable member apart.

44. An instrument according to claim 43, in which the arcuate member is located on the nose portion or the slidable member adjacent its mid-point and its free ends are engageable against the slidable member or the nose portion,
30 respectively.

45. An instrument according to any of claims 26 to 44, in which the nose portion is movable relative to the body portion to allow access to a rolled lens located in the lumen of the nose portion.

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46. An instrument according to claim 45, in which the nose portion is hingedly connected to the body portion and is movable between an open position in which said access is allowed and a closed position in which the plunger is movable
10 into the nose portion.

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47. An instrument according to claim 45, in which the nose portion is separable from the body portion and the nose and body portions are a press-fit together.

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48. An instrument according to claim 47, in which nose and body portions are a press-fit together by means of at least one pin on one of the portions engaging in a corresponding bore in the other portion.

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49. An instrument according to any of claims 21 to 48, in combination with a compression block which is shaped to receive the instrument when the lens-rolling members are in their relative position in which the lens is rolled and ready
25 for delivery.

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50. A method of preparing an ophthalmic lens for insertion into an eye which comprises rolling the lens into a tubular configuration.

51. A method according to claim 50, including the further step of cooling the rolled lens prior to insertion so that it tends to maintain its tubular configuration.

52. A method according to claim 50 or 51, in which the rolled lens has a spiral configuration in transverse section.

53. A method of preparing an ophthalmic lens for
5 insertion into an eye, the method being substantially as
hereinbefore described with reference to the drawings.

54. A method according to any of claims 50 to 53 and
carried out by use of a device according to any of claims 1
10 to 19.

55. A method according to claim 54, in which the rolled
lens is removed from the device and placed in an insertion
instrument prior to insertion into an eye.

15 56. A method of inserting an ophthalmic lens in an eye,
comprising preparing the lens by a method according to any of
claims 50 to 55, making an incision in the eye and inserting
the rolled lens into the eye by way of the incision.

20 57. A method according to claim 56 and carried out by
use of an instrument according to any of claims 20 to 49.

58. A method according to claim 56 carried out by use
25 of an instrument according to any of claims 22 to 25 and 45
to 48, in which the cooling is carried out after movement of
the nose portion relative to the body portion to allow
application of a cooling fluid to the rolled lens located in
the nose portion.

30 59. A device for rolling a thin ophthalmic lens for
insertion into an eye, the device being substantially as
hereinbefore described with reference to figure 10 of the
drawings.

60. An instrument for inserting an ophthalmic lens into an eye, the instrument being such as hereinbefore described with reference to figures 1 to 9 and 14 to 24 of the drawings.